

Notice of Allowability

Application No.

10/798,910

Applicant(s)

BROUSSARD, SCOTT J.

Examiner

JAMES HWA

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/9/2008.
2. ☒ The allowed claim(s) is/are 1,4-10,13-19 and 22-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

DETAILED ACTION

1. This Office Action is response to Applicants' Request for Appeal Brief filed on 05/09/2008. Claims 1-27 are pending in this Office Action.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Carlos E. Amorin (Reg. No.: 78759) on 07/18/2008.

3. **In the specification:** Please replace paragraph [0051] with the below paragraph:

[0051] While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention. For example, the present invention may be implemented using any combination of computer programming software, firmware or hardware. As a preparatory step to practicing the invention or constructing an apparatus according to the invention, the computer programming code (whether software or firmware) according to the invention will typically be stored in one or more machine readable storage mediums such as fixed (hard) drives, diskettes, optical disks, magnetic tape, semiconductor

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memories such as ROMs, PROMs, thereby making an article of manufacture in accordance with the invention. The article of manufacture containing the computer programming code is used by either executing the code directly from the storage device, by copying the code from the storage device into another storage device such as a hard disk, RAM, or by transmitting the code for remote execution. The method form of the invention may be practiced by combining one or more machine-readable storage devices containing the code according to the present invention with appropriate standard computer hardware to execute the code contained therein. An apparatus for practicing the invention could be one or more computers and storage systems containing or having network access to computer program(s) coded in accordance with the invention. While this invention is described in terms of the best mode for achieving this invention's objectives, it will be appreciated by those skilled in the art that variations may be accomplished in view of these teachings without deviating from the spirit or scope of the present invention.

4. **In claims:** Please replace claims 1, 4-6, 10 13-15, 19, 22-24 with amended claims 1, 4-6, 10 13-15, 19, 22-24.

Please cancel claims 2, 3, 11, 12, 20 and 21.

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1. (Currently amended) A computer-implemented method for assisting detection of critical memory leaks in a software program, the method comprising the steps of:

monitoring an amount of available memory for the software program during execution of the software program;

determining if the amount of available memory for the software program is less than a predetermined amount; and

in response to such determination, storing a current stack walkback of each object currently referenced by the software program prior to the available memory dropping below an amount necessary to store the current stack walkback, wherein the current stack walkback assists in the detection of a critical memory leak during execution of the software program;

monitoring specified one or more analysis properties of objects referenced by the software program, wherein the one or more specified analysis properties consists of at least one of an object's age and an object's instance count;

determining if any analysis property of the objects being referenced following a garbage collection process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value; and

identifying any objects determined to have one or more analysis properties that exceeds property's predetermined limit;

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calculating an object's age by timing a current period starting when the respective object was instantiated.

2. (cancelled)

3. (cancelled)

4. (Currently amended) The method according to claim 1, further comprising the step of calculating an object's instance count growth as magnitude of growth of an object instance count over a given time period.

5. (Currently amended) The method according to claim 1, wherein the step of monitoring comprises monitoring objects within a class designated for monitoring.

6. (Currently amended) The method according to claim 1, further comprising the step of performing the current stack walkbacks for the identified objects.

10. (Currently amended) A computer-implemented system for assisting detection of critical memory leaks in a software program comprising:

one processor;

means for monitoring an amount of available memory for the software program during execution of the software program;

means for determining if the amount of available memory for the software program is less than a predetermined amount; and

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means for, in response to determination, storing a current stack walkback of each object currently referenced by the software program prior to the available memory dropping below an amount necessary to store the current stack walkback, wherein the current stack walkback assists in the defection of critical memory leak during execution of the soft-ware program;

means for monitoring specified one or more analysis properties of the objects referenced by the software program, wherein the one or more specified analysis properties consists of at least one of an object's age and an object's instance count;

means for determining if any analysis property of the objects being referenced following a garbage collection process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value; and

means for identifying software objects determined to have one or more analysis properties that exceeds property's predetermined limit;

means for calculating an object's age by timing a current period starting when respective object was instantiated.

11. (cancelled)

12. (cancelled)

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13. (Currently amended) The system according to claim 10, further comprising means for calculating object instance count growth as magnitude of growth of an object's instance count over a given time period.

14. (Currently amended) The system according to claim 10, wherein means for monitoring comprises means for monitoring objects within a class designated for monitoring.

15. (Currently amended) The system according to claim 10, further comprising means for performing the current stack walkbacks for the identified objects.

18. (Currently amended) The system according to claim 10, wherein the software objects are Java objects.

19. (Currently amended) An article of manufacture comprising machine-readable storage medium including program logic embedded therein for assisting detection of critical memory leaks in a software program that causes control circuitry in a data processing system to perform the steps of:

monitoring an amount of available memory for the software program during execution of the software program;

determining if the amount of available memory for the software program is less than a predetermined amount; and

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in response to such determination, storing a current stack walkback of each object currently referenced by the software program prior to the available memory dropping below an amount necessary to store the current stack walkback, wherein the current stack walkback assists in the detection of a critical memory leak during execution of the software program;

monitoring, specified one or more analysis properties of objects referenced by the software program, wherein the one or more specified analysis properties consists of at least one of an object's age and an object's instance count;

determining if any analysis property of the objects being referenced following a garbage collection process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value;

identifying any objects determined to have one or more analysis properties that exceeds property's predetermined limit; and

calculating an object's age by timing a current period starting when respective object was instantiated.

20. (cancelled)

21. (cancelled)

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22. (Currently amended) The article of manufacture of Claim [[20]] 19, further comprising the step of calculating object instance count growth as magnitude of growth of an object's instance count over a given time period.

23. (Currently amended) The article of manufacture of Claim [[20]] 19, wherein the step of monitoring comprises monitoring objects within a class designated for monitoring.

24. (Currently amended) The article of manufacture of Claim [[20]] 19, further comprising the step of performing the current stack walkbacks for the identified objects.

Allowable Subject Matter

5. Claims 1, 4-10, 13-19 and 22-27 are allowed.
6. The closest prior art, Patent No.: US 6,523,141 B1 of Cantrill (hereinafter Cantrill) teaches a method of identifying memory leaks involves looking at buckets of memory to identify a bucket which includes an abnormal number of allocations; Where Patent Application No.: 2004/0078540 A1 of Cirne (hereinafter Cirne) teaches a method for finding memory leaks is to repeat an action many times and to conclude that there are no leaks if the address space growth levels out; Where Patent Application No.: 2005/0076184 A1 of Schumacher (hereinafter Schumacher) teaches a system and method for detecting memory leaks includes a monitoring agent, a user interface for

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configuring operating parameters and a reporting mechanism; Where Patent No.: US 7,089,460 B2 of Fu (hereinafter Fu) teaches a method of detecting memory leaks in computing environments that does not require examining all aspects of a computer's memory.

However, the prior arts of record such as Cantrill, Cirne, Schumacher and Fu does not teach or fairly suggest the steps as recited in independent in claim 1, wherein "monitoring a specified one or more analysis properties of the objects referenced by the software program, wherein the one or more specified-analysis properties consists of at least one of an object's age and an object's instance count; determining if any analysis property of the objects being referenced following a garbage collection process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value; and identifying any objects determined to have one or more analysis properties that exceeds that property's predetermined limit; wherein calculating an object's age by timing a current period starting when the respective object was instantiated".

The prior art of record does not teach or fairly suggest the steps as recited in independent in claim 10, wherein "means for monitoring a specified one or more analysis properties of the objects referenced by the software program, wherein the one or more specified analysis properties consists of at least one of an object's age and an object's instance count; means for determining if any analysis property of the objects being referenced following a garbage collection

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process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value; and means for identifying software objects determined to have one or more analysis properties that exceeds that property's predetermined limit; Wherein means for calculating an object's age by timing a current period starting when the respective object was instantiated"; and

The prior art of record does not teach or fairly suggest the steps as recited in independent in claim 19, wherein "monitoring, a specified one or more analysis properties of the objects referenced by the software program, wherein the one or more specified analysis properties consists of at least one of an object's age and an object's instance count; determining if any analysis if any analysis property of the objects being referenced following a garbage collection process exceeds a predetermined limit for such analysis property, wherein the predetermined limit for an object's age is an object age limit and the predetermined limit for an object's instance count is an object instance count growth value; and identifying any objects determined to have one or more analysis properties that exceeds that property's predetermined limit; wherein calculating an object's age by timing a current period starting when the respective object was instantiated".

The dependent claims bring definite, further limiting, and fully enable by the specification are also allowed.

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7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Hwa whose telephone number is 571-270-1285. The examiner can normally be reached on 8:00 – 5:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only, for more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

07/18/2008

/James Hwa/
Examiner, Art Unit 2163

/Cam Y Truong/
Primary Examiner, Art Unit 2162